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DEVICE FOR VENTILATION OF THE FEET BY INTRODUCTION OF FRESH AIR INTO CLOSED SHOES

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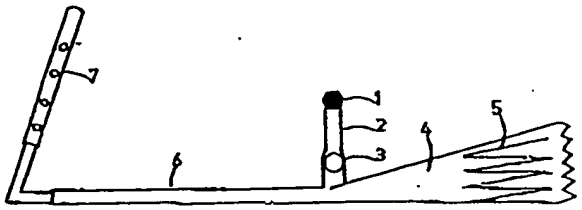
Abstract:

The invention concerns a device that produces a cycle of alternating successions of intakes and discharges of fresh air using the mechanical force produced by the heel during walking. It is provided with air filter (1), connecting tube (2), intake valve (3), bellows (4) provided with a spring (5), discharge tube (6), discharge valve (7). The bellows (4) is subjected by the heel of the user to the intake of fresh air alternating with its discharge, as a result of valves (3) and (7) which cause the fresh air to advance within the shoe. The device, designed for the shoe industry, is used for removing unpleasant odor produced by sweating.



The present invention concerns a device designed for ventilating the feet in closed shoes.

As a result of this invention total removal of the unpleasantness from sweating is successfully achieved.

From the point of view of ventilation possibilities, traditionally shoes are either cut out or provided with lateral ventilation orifices or perforations, these possibilities not being sufficient to eliminate undesirable sweating.

The device according to this invention allows this drawback to be remedied.

This device may be included in the technical field of the leather and shoe industry and at the same time, it may be part of the production of small workshops.

It is possible either for the device to be incorporated in the shoe assembly or to be introduced later into a traditional shoe.

The device according to the invention includes the following principal elements:

- a vertical intake tube provided at the top with a filter
- an intake valve
- a bellows provided with a helical spring
- a horizontal discharge tube provided with a valve which is opened when the air pressure value in the horizontally oriented tube reaches the value established by calculation, this happening by increase

According to the specific methods of the embodiment:

- the intake valve may either be part of the filter or intake tube – the vertical tube – or of the bellows of this device;
- the bellows may either be provided with two lateral springs located on the two sides, the left side and the right side of the bellows, or with a helical spring, located centrally

The attached drawings illustrate the invention according to the following method:

- Figure 1 represents the cross section of the filter of the device according to the invention;

- Figure 2 represents the vertical section of the intake tube and the intake valve of the device according to the invention;

- Figure 3 represents the cross section of the discharge tube with the valve that functions at a constant and predetermined pressure, represented with the discharge orifices for the ventilation air;

- Figure 4 represents the cross section of the bellows with helical spring, inside, placed centrally;

- Figure 5 represents the disassembled device;

- Figure 6 represents the cross section of the device according to the invention;

- Figure 7 represents the device according to the invention viewed from above;

- Figure 8 represents the sole in the state of rest;

- Figure 9 represents the sole tensioned by the heel.

In reference to these drawings, the device includes the air filter (1) located at the beginning of the vertical intake tube (2) that is provided inside with an intake valve (3) located at the bottom, very near the bellows (4), the bellows being provided with a helical spring (5) located centrally.

At the continuation of the bellows (4) is found the horizontal discharge tube (6) provided with a discharge valve (7), this tube finishing with small orifices (7c) for the discharge of air, thus liberated under pressure.

The air filter (1) represented in Figure 1 consists of:

- A rubber sleeve (1a) and a filtering material (1b) such as felt or another filtering material.

The intake tube (2) represented in Figure 2, connects the air filter (1) with the intake valve (3).

It is made of rubber.

The intake valve (3) is attached to the interior of the vertical intake tube (2) and is made from a mixture of rubber and plastic.

The valve (3) contains on the interior a tapering channel (3a) and a polystyrene bead (3b).

The horizontal discharge tube (6) begins from the valve (3), represented in Figure 2, in the intake tube; it is provided on the other end with the discharge valve (7) and represented with the valve and its orifices in Figure 3.

The valve (7) ensures the discharge of ventilation air starting from a pressure value of the air in the horizontal tube (6), established beforehand.

This valve has a rubber sleeve (7a), a sealing orifice (7b) and four discharge orifices (7c).

The horizontal discharge tube (6) ends with these orifices that ensure the distribution of ventilation air provided by the system that carries out the artificial pumping and conducts the air from the heel to the toes.

The bellows (4) represented in Figure 4 is closed and made with a rubberized surface or thin rubber, with a central helical springs made from steel wire attached within. This spring, in a state of tension during operation of the system, is buried in the mass of the bellows.

The operating principle of this device is represented by alternating pumping of the air produced by the movement of the heel of the foot during walking.

At the beginning, the bellows (4) is found in a state of rest and its entire volume is filled with air.

This is the situation that characterizes the state before the introduction of the foot into the shoe provided with this device.

At the moment of introduction of the foot into this shoe, the spring (5) is put in a state of tension and the volume of the bellows (4) is caused to decrease. In this state, the air from the bellows (4) is pushed under pressure.

This closes the intake valve (3) and it takes the direction allowed, from the discharge tube (6) after it meets the discharge valve (7) that opens at the moment when the value of the air pressure of the tube (6), while increasing, arrives at the value obtained by calculation.

When the foot is lifted during walking, the spring (5) is extended as a result of the potential energy accumulated previously in a state of tension, the volume of the bellows begins to increase, and subsequently the creation of a vacuum takes place in which the effect is the intake of fresh and filtered air by opening the intake valve.

The bellows is thus filled with ventilation air and when the heel descends, it exerts a pressure on the latter, by which the decrease in its volume and closing of the intake valve (3) is determined.

The ventilation air is obligated to follow the direction of the discharge tube (6) and it arrives at the valve (7), small gap indicating possible omission this condition being realized with the necessity of overcoming the opposing resistance by the rubber sleeve (7a), resistance wherein the value is chosen relative to the value of the predetermined air pressure.

These calculations are determined in a certain way so that the discharge valve (7) can eliminate the ventilation air at a pressure with a higher value, having the goal of provoking a forced elimination of the clean and fresh air, which pushes the contaminated air to the outside.

The four ventilation orifices (7c) are placed between both toes of the foot to ensure an area of diffusion, a sufficient extension of the ventilation effect.

By way of nonlimiting example, the dimensions may be the following:

- diameter of the intake tube (2) and discharge tube (6) of 5 mm;

- diameter of the steel wire of the helical spring (5) of 1 mm;

All other dimensions are variable according to the size of the shoe.

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FIG 1

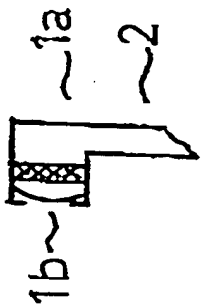

FIG 2

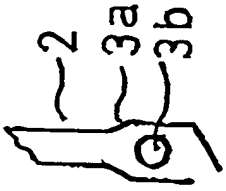

FIG 3

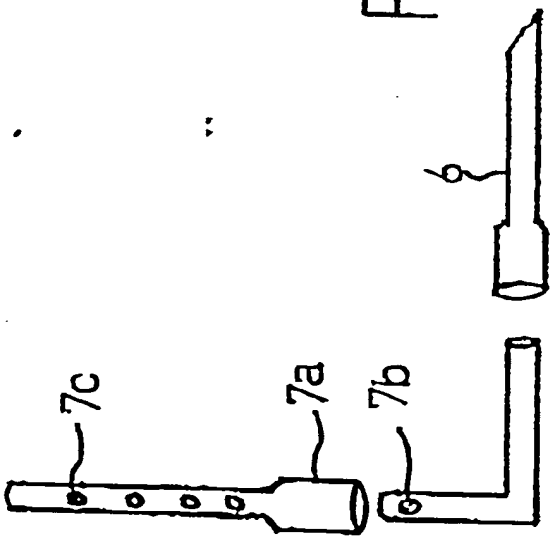

FIG 4

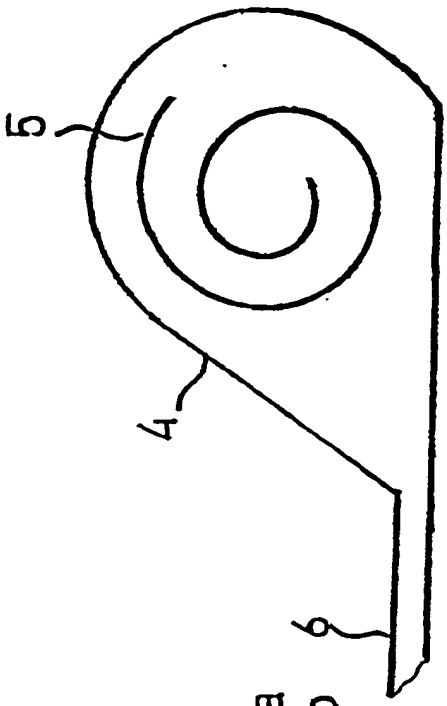

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FIG5

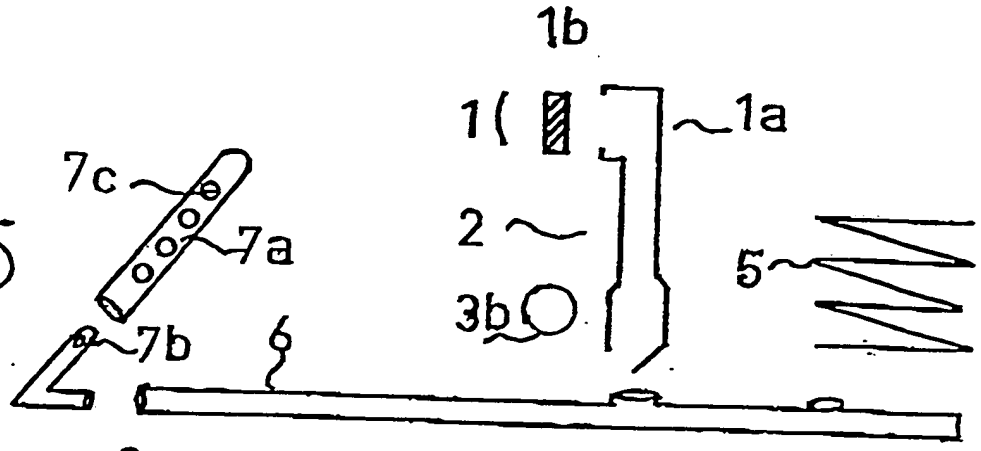

FIG6

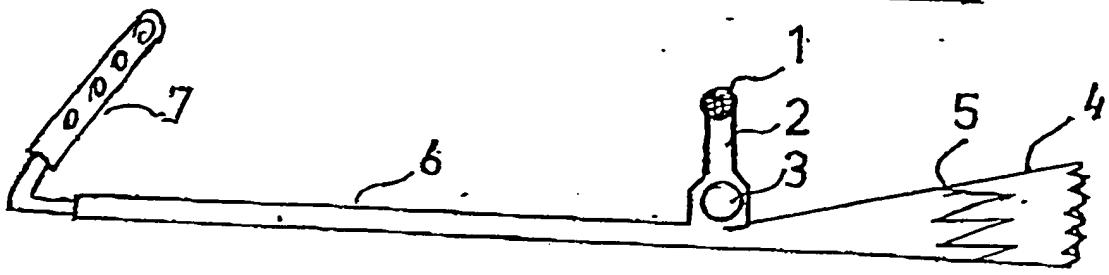

FIG7

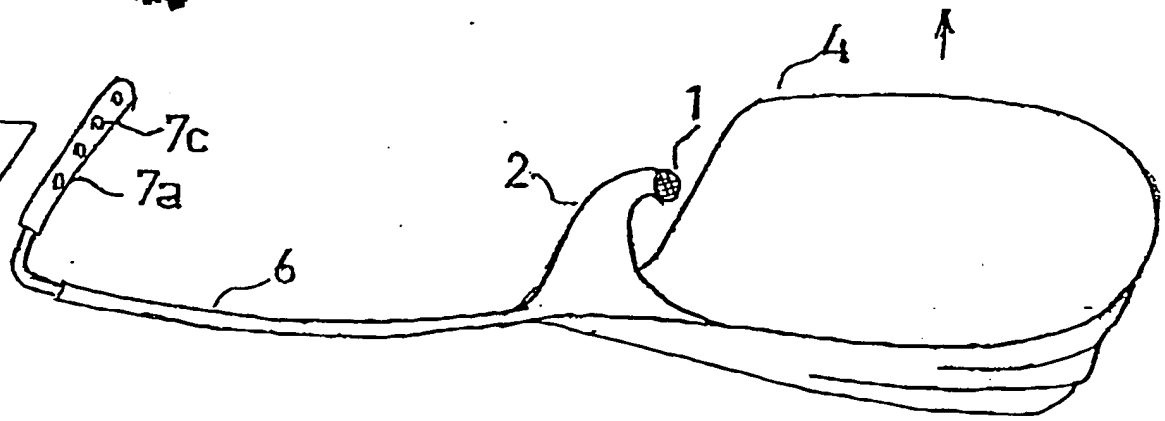

FIG8

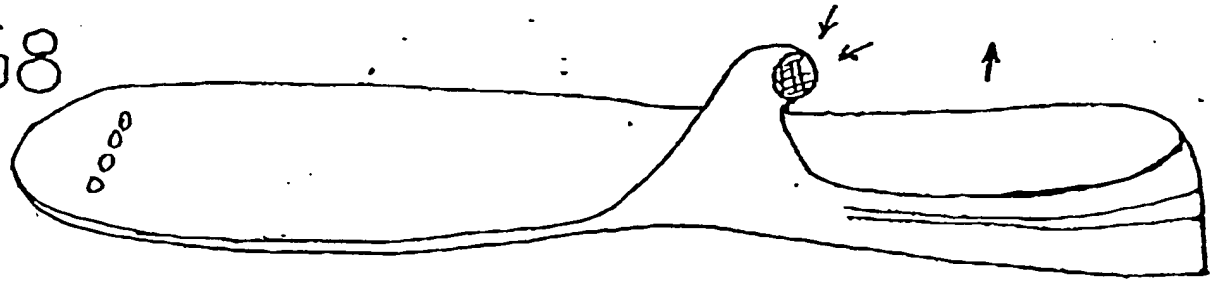

FIG9